

Glen Ridge Public Schools –Mathematics Curriculum

Course Title: Advanced Pre-Algebra 7

Subject: Mathematics

Grade Level: 7th Grade

Duration: 1 Academic School Year

Prerequisite: Final grade of an *A* in Math 6, Achieve Mastery Level on the Advanced Placement Test Rubric, a score of 775 on the PARCC 5 Standardized Exam, and a score of 125 on the 5th Grade InView Test of Cognitive Skills

Elective or Required: Required Course Content

Mathematics Mission Statement

Mathematics is an integral part of our lives. Students must be actively involved in their mathematics education through the use of modeling and demonstrating the ability to persevere through problem solving. The mathematics curricula will emphasize critical thinking skills through a balance of logic and reasoning, attention to precision by utilizing patterns and structure, and bridging these ideas to cross-curricular learning. Students will be engaged and challenged in a student-centered learning environment that is developmentally appropriate and will communicate mathematical ideas, both in a verbal and written form. Through effectively applying hands-on manipulatives, basic computation skills and the use of technical writing to justify their processes, students will critique the work of themselves and others.

Course Description:

Advanced Pre-Algebra 7 students will develop fundamental mathematical ideas and methods through a student-centered based curricula. These methods provide a strong foundation in algebraic and geometric concepts. A student selected for this course must be self-motivated and has demonstrated high mathematical ability and achievement. The student must be able to work in a fast paced atmosphere at an abstract level. This course emphasizes problem solving, reasoning, communication, connections, representations, and technology from an in-depth perspective. Throughout the course, the following content standards will be developed: number relationships and computation/arithmetic; algebra, patterns, and functions; geometry and measurement; and data analysis, statistics, and probability. Students will be exposed to each of

these domains at the level of both the 7th and 8th grade New Jersey Learning Standards. This course prepares students for Algebra I in 8th grade.

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Advanced Pre-Algebra 7

Unit 1: Operations with Integers

Approximate # Of Weeks: 2 weeks

Essential Questions:

- How are velocity and speed related?
- How can you tell the sign of the sum of two integers?
- How are adding and subtracting integers related?
- How can you tell the sign of the product of two integers?
- How can you tell the sign of the quotient of two integers?
- How do you solve problems using the coordinate plane?

New Jersey Student Learning Standards: 7.EE.3, 7.NS.1, 7.NS.2, 7.NS.3, NCTM Mathematical Practices

Upon completion of this unit students will be able to:

- *Use powers to describe repeated multiplication (6.NS.1).
- *Compare and order integers (6.NS.5).
- *Identify and plot points in a coordinate plane (6.NS.6).
- Add integers (7.NS.1, 7.NS.3, 7.EE.3).
- Subtract integers (7.NS.1).
- Multiply integers (7.NS.2, 7.EE.2).
- Divide integers (7.NS.2, 7.EE.2).

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.1 – U.S. History: America in the World
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.1 – Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- Daily guided notes/cooperative activities for each lesson (see Appendix A for sequence)
- Group work on lesson practice
- Math XL video tutorials
- Google Classroom
- KhanAcademy Mission
- Graded Classwork Summative Assessments
- Integer Bingo
- Integer I Have Who Has Activity

Enrichment Activities:

- Challenge Problems
- Problem Solving Worksheets
- Concept Tasks

Methods of Assessments/Evaluation:

- Entry/Exit slips and scales
- Student reflection
- Math Chat
- K-W-L Graphic Organizer
- Homework (Math XL)
- Concept Tasks (Real World Analogies)
- Graded Classwork Summative Assessments
- Quizzes
- Marking Period Project
- Quarterly Assessment

Resources/Including Online Resources

- Math XL
- Google Classroom
- KhanAcademy Mission
- Selected Websites (See Appendix B)

Unit 2: Rational Numbers and Equations

Approximate # Of Weeks: 2 weeks

Essential Questions:

- How can you use a number line to order rational numbers?
- How does adding and subtracting rational numbers compare with adding and subtracting integers?
- How is multiplying and dividing rational numbers similar to multiplying and dividing integers?
- Does the order in which you perform an operation matter?
- How does keeping an equation balanced aid in solving an equation?
- How do you identify and combine like terms?
- In a two-step equation, which step should you do first?

New Jersey Student Learning Standards: 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.1, 7.EE.2, 7.EE.4, NCTM Mathematical Practices

Upon completion of this unit students will be able to:

- *Solve equations using addition or subtraction (6.EE.7).
- *Solve equations using multiplication or division (6.EE.7).
- *Solve equations involving decimals (6.EE.7).
- Use properties of addition and multiplication (7.NS.1).
- Use the distributive property (7.NS.1).
- Simplify variable expressions (7.EE.1, 7.EE.4).
- Write equations (7.EE.2, 7.EE.4).
- Solve multi-step equations (7.EE.3, 7.EE.4).

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.1 – U.S. History: America in the World
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.1 – Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- Daily guided notes/cooperative activities for each lesson (see Appendix A for sequence)
- Group work on lesson practice
- Math XL video tutorials
- Google Classroom
- KhanAcademy Mission
- Graded Classwork Summative Assessments
- Balancing Scales Activity

- Modeling with Algebra Tiles to Solve Equations

Enrichment Activities:

- Challenge Problems
- Problem Solving Worksheets
- Concept Tasks

Methods of Assessments/Evaluation:

- Entry/Exit slips and scales
- Student reflection
- Math Chat
- K-W-L Graphic Organizer
- Homework (Math XL)
- Concept Tasks (Real World Analogies)
- Graded Classwork Summative Assessments
- Quizzes
- Marking Period Project
- Quarterly Assessment

Resources/Including Online Resources

- Math XL
- Google Classroom
- KhanAcademy Mission
- Selected Websites (See Appendix B)

Unit 3: Proportions & Variation (with Percents)

Approximate # Of Weeks: 6 weeks

Essential Questions:

- How do rates help you describe real-life problems?
- How does the relationship of distance and time relate to the slope of a line?
- How can proportions help you decide when things are fair?
- How can you write a proportion that solves a problem in real life?
- How can you use ratio tables and cross products to solve proportions in science?
- How can you compare lengths between the customary and metric systems?
- How is direct variation a proportional relationship?
- How can you recognize when two variables are inversely proportional?
- How can you use models to estimate percent questions?

- How do you use percents to solve problems?
- What is a percent of decrease? What is a percent of increase?
- How do you find markups and discounts efficiently?
- How can you find the amount of simple interest earned on a savings account? How can you find the amount of interest owed on a loan?

New Jersey Student Learning Standards: 7.RP.1, 7.RP.2, 7.RP.3, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.2, 7.EE.3, NCTM Mathematical Practices

Upon completion of this unit students will be able to:

- * Use equivalent fractions to find ratios and unit rates (6.RP.1).
- * Apply cross products to solving proportions. (6.RP.2).
- Write and solve proportions (7.RP.1, 7.RP.2, 7.NS.3, 7.EE.2, 7.EE.3).
- Identify the difference between direct and inverse variation (7.RP.1, 7.RP.2).
- Solve percent application problems (7.RP.3, 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.2, 7.EE.3).

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.1 – U.S. History: America in the World
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.1 – Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- Daily guided notes/cooperative activities for each lesson (see Appendix A for sequence)
- Group work on lesson practice
- Math XL video tutorials
- Google Classroom
- KhanAcademy Mission
- Graded Classwork Summative Assessments
- CBR Slope Activity
- Percent Applications Choice Menu

Enrichment Activities:

- Challenge Problems
- Problem Solving Worksheets
- Concept Tasks

Methods of Assessments/Evaluation:

- Entry/Exit slips and scales
- Student reflection
- Math Chat
- K-W-L Graphic Organizer
- Homework (Math XL)
- Concept Tasks (Real World Analogies)
- Graded Classwork Summative Assessments
- Quizzes
- Marking Period Project
- Quarterly Assessment

Resources/Including Online Resources

- Math XL
- Google Classroom
- KhanAcademy Mission
- Selected Websites (See Appendix B)

Unit 4: Radicals & the Pythagorean Theorem

Approximate # Of Weeks: 3 weeks

Essential Questions:

- What is a perfect square?
- How can you find the side length of a square when you are given the area of the square?
- How are the length of the sides of a right triangles related?
- How can you find decimal approximations of square roots that are irrational?
- How can you simplify square roots?
- How do you find the cube root of a number?
- How can you use the Pythagorean Theorem to solve real-life problems?

New Jersey Student Learning Standards: 8.EE.2, 8.G.6, 8.G.7, 8.G.8, 8.NS.1, 8.NS.2, NCTM Mathematical Practices

Upon completion of this unit students will be able to:

- Find and approximate square roots of numbers (8.NS.1, 8.NS.2, 8.EE.2)
- Simplify radical expressions (8.NS.2).
- Use the Pythagorean Theorem to solve problems (8.G.6, 8.G.7, 8.G.8).
- Compare and order real numbers (8.NS.2).

- Find cube roots of numbers (8.NS.2, 8.EE.2).

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.1 – U.S. History: America in the World
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.1 – Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- Daily guided notes/cooperative activities for each lesson (see Appendix A for sequence)
- Group work on lesson practice
- Math XL video tutorials
- Google Classroom
- KhanAcademy Mission
- Graded Classwork Summative Assessments
- Discovering the Pythagorean Theorem Puzzle

Enrichment Activities:

- Challenge Problems
- Problem Solving Worksheets
- Concept Tasks

Methods of Assessments/Evaluation:

- Entry/Exit slips and scales
- Student reflection
- Math Chat
- K-W-L Graphic Organizer
- Homework (Math XL)
- Concept Tasks (Real World Analogies)
- Graded Classwork Summative Assessments
- Quizzes
- Marking Period Project
- Quarterly Assessment

Resources/Including Online Resources

- Math XL
- Google Classroom

- KhanAcademy Mission
- Selected Websites (See Appendix B)

Unit 5: Exponents & Scientific Notation

Approximate # Of Weeks: 2 weeks

Essential Questions:

- How can you multiply two powers that have the same base?
- How can you simplify expressions containing exponents?
- Question: How do we rewrite expressions containing negative exponents?
- How can you read and use numbers written in scientific notation?
- How do you multiply or divide numbers written in scientific notation?
- How do you add or subtract numbers written in scientific notation?

New Jersey Student Learning Standards: 8.NS.1, 8.NS.2, 8.EE.1, 8.EE.3, 8.EE.4, NCTM Mathematical Practices

Upon completion of this unit students will be able to:

- Multiply and divide powers (8.NS.1, 8.NS.2, 8.EE.1).
- Work with negative and zero exponents (8.NS.1, 8.NS.2, 8.EE.1).
- Write numbers using scientific notation (8.EE.1, 8.EE.3).
- Perform operations with numbers in scientific notation (8.EE.3, 8.EE.4).

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.1 – U.S. History: America in the World
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.1 – Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- Daily guided notes/cooperative activities for each lesson (see Appendix A for sequence)
- Group work on lesson practice
- Math XL video tutorials
- Google Classroom
- KhanAcademy Mission
- Graded Classwork Summative Assessments

- Exponent Match Puzzle

Enrichment Activities:

- Challenge Problems
- Problem Solving Worksheets
- Concept Tasks

Methods of Assessments/Evaluation:

- Entry/Exit slips and scales
- Student reflection
- Math Chat
- K-W-L Graphic Organizer
- Homework (Math XL)
- Concept Tasks (Real World Analogies)
- Graded Classwork Summative Assessments
- Quizzes
- Marking Period Project
- Quarterly Assessment

Resources/Including Online Resources

- Math XL
- Google Classroom
- KhanAcademy Mission
- Selected Websites (See Appendix B)

Unit 6: Similarity & Transformations

Approximate # Of Weeks: 5 Weeks

Essential Questions:

- How can you classify two angles as supplementary or complementary?
- How can you use properties of parallel lines to solve real-world situations?
- How do you find the interior angle measure of a polygon using triangles?
- What are the corresponding parts of congruent figures?
- How can you apply properties of similarity to real world situations?
- How do changes in dimensions of similar geometric figures affect the perimeters and areas of the figures?
- How do we apply the relationship of similar figures to find missing angle measures and side lengths?

- How are similar figures applied to real world situations?
- How can you determine which transformations maintain congruency and which transformations create similar figures?

New Jersey Student Learning Standards: 7.G.1, 7.G.5, 8.G.1, 8.G.2, 8.G.3, 8.G.4, 8.G.5

Upon completion of this unit students will be able to:

- Classify special pairs of angles. (7.G.5, 8.G.1, 8.G.5)
- Identify angles when a transversal intersects lines. (8.G.5)
- Find measures of interior and exterior angles. (7.G.5, 8.G.1, 8.G.5)
- Translate geometric figures in a coordinate plane. (8.G.1, 8.G.3, 8.G.4)
- Reflect figures and identify lines of symmetry. (8.G.1, 8.G.3, 8.G.4)
- Rotate figures and identify rotational symmetry (8.G.1, 8.G.3, 8.G.4)
- Dilate figures in a coordinate plane. (8.G.1, 8.G.3, 8.G.4)
- Copy a segment and an angle. (8.G.1)
- Construct the perpendicular bisector of a segment. (8.G.1)
- Construct the angle bisector of an angle. (8.G.1)
- Construct parallel lines through a line and a point not on the line. (CC.8.G.1)
- Construct a similar triangle. (8.G.1, 8.G.5)
- Perform multiple transformations in the coordinate plane. (8.G.1, 8.G.2, 8.G.3, 8.G.4)

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.1 – U.S. History: America in the World
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.1 – Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- Daily guided notes/cooperative activities for each lesson (see Appendix A for sequence)
- Group work on lesson practice
- Math XL video tutorials
- Google Classroom
- KhanAcademy Mission
- Toy Car Scale Measurement Activity
- Transformation Activity Packet
- Graded Classwork Summative Assessments

Enrichment Activities:

- Challenge Problems
- Problem Solving Worksheets
- Concept Tasks

Methods of Assessments/Evaluation:

- Entry/Exit slips and scales
- Student reflection
- Math Chat
- K-W-L Graphic Organizer
- Homework (Math XL)
- Concept Tasks (Real World Analogies)
- Graded Classwork Summative Assessments
- Quizzes
- Marking Period Project
- Quarterly Assessment

Resources/Including Online Resources

- Math XL
- Google Classroom
- KhanAcademy Mission
- Selected Websites (See Appendix B)

Unit 7: Surface Area & Volume

Approximate # Of Weeks: 2 Weeks

Essential Questions:

- How do you find the circumference and area of a circle?
- What two-dimensional shapes are created by slicing three-dimensional figures?
- How do you use a net to find the surface area of a prism, cylinder, pyramid or cone?
- How do you use the base and faces of a three-dimensional figure to find the volume?

New Jersey Student Learning Standards: 7.G.2, 7.G.3, 7.G.4, 7.G.5, 7.G.6, 8.G.9

Upon completion of this unit students will be able to:

- *Solve problems involving triangles. (6.G.1)
- *Classify polygons and quadrilaterals. (6.G.1)
- *Find the areas of parallelograms and trapezoids. (6.G.1)

- Find the circumferences and area of circles. (7.G.4)
- Find the surface areas of prisms and cylinders. (7.G.4, 7.G.6)
- Find the surface area of pyramids and cones (7.G.4, 7.G.6)
- Describe two-dimensional figures that result from slicing three-dimensional figures (7.G.3)
- Find the volume of prisms and cylinders (7.G.4, 7.G.6, 8.G.9)
- Convert areas and volumes within or between systems of measurement (7.G.6)
- Find the volumes of pyramids and cones (7.G.4, 7.G.6)
- Determine the effect of changes in dimensions on perimeter, area and volume (7.G.6)
- Find the surface area and volume of composite solids (7.G.4, 7.G.6)
- Use the distance and midpoint formulas (7.G.6).

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.1 – U.S. History: America in the World
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.1 – Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- Daily guided notes/cooperative activities for each lesson (see Appendix A for sequence)
- Group work on lesson practice
- Math XL video tutorials
- Google Classroom
- KhanAcademy Mission
- Ang-Legs Labs
- Cross Sections Explorations with Play-Doh
- White Board Composite Figures Activity

Enrichment Activities:

- Challenge Problems
- Problem Solving Worksheets
- Concept Tasks

Methods of Assessments/Evaluation:

- Entry/Exit slips and scales
- Student reflection
- Math Chat

- K-W-L Graphic Organizer
- Homework (Math XL)
- Concept Tasks (Real World Analogies)
- Graded Classwork Summative Assessments
- Quizzes
- Marking Period Project
- Quarterly Assessment

Resources/Including Online Resources

- Math XL
- Google Classroom
- KhanAcademy Mission

Unit 8: Data Analysis & Samples

Approximate # Of Weeks: 6 Weeks

Essential Questions:

- What information does a stem-and-leaf plot provide?
- How do we use histograms?
- How can you use measures of central tendency to distribute an amount evenly among a group of people?
- How can you analyze the quartiles of data?
- How can you use data to predict an event?
- Which data display correctly represents a given set of data?
- How can you use a survey to make conclusions about a general population?
- How can you use measures of central tendency and variation to compare populations?
- How can you analyze two-variable data using a table?
- How does a margin of error affect the result of a survey?
- How can we compare data using the measures of spread?
- How can probability be used to predict events?
- How does theoretical probability determine fairness?
- How can you use experimental probability to predict the likelihood of an event?
- Why do we compare experimental and theoretical probabilities?
- How do you decide whether two events are overlapping or disjoint?
- What is the difference between dependent and independent events?
- How do you convert between probability and odds?
- How can you use a simulation to efficiently find an experimental probability?

New Jersey Student Learning Standards: 7.SP.1, 7.SP.2, 7.SP.3, 7.SP.4, 7.SP.5, 7.SP.6, 7.SP.7, 7.SP.8, 8.SP.1, 8.SP.2, 8.SP.3, 8.SP.4

Upon completion of this unit students will be able to:

- *Construct stem-and-leaf plots. (6.SP.4)
- *Construct histograms. (6.SP.4)
- *Use circle graphs to describe data. (6.SP.4)
- Make and interpret box-and-whisker plots. (7.SP.2, 7.SP.3, 7.SP.4)
- Use a graphing calculator to create a box-and-whisker plot. (7.SP.2, 7.SP.3, 7.SP.4)
- Choose appropriate data displays. (7.SP.2, 7.SP.4, 8.SP.1)
- Construct and analyze the data in a scatterplot. (8.SP.1, 8.SP.2, 8.SP.3)
- Compare two sets of data using a two-way table. (8.SP.4)
- Access the degree of visual overlap of two data distributions. (7.SP.3)
- Identify populations and sampling methods (7.SP.1, 7.SP.2)
- Use the multiplication principle to find probabilities (7.SP.7)
- Use the addition principle to find probabilities (7.SP.7)
- Find probabilities (7.SP.5, 7.SP.6, 7.SP.7, 7.SP.8)
- Find the probability that event A and B occur (7.SP.7, 7.SP.8).

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.1 – U.S. History: America in the World
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.1 – Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- Daily guided notes/cooperative activities for each lesson (see Appendix A for sequence)
- Group work on lesson practice
- Math XL video tutorials
- Google Classroom
- KhanAcademy Mission
- TI-84 Box-and-Whisker Plot Lab
- Two-Way Table Data Collection and Analysis Activity
- Ages of Famous People Scatterplot Lab
- Conducting Experiments to Identify Probability Activity
- Solving Genetics Problems Using Probability

Enrichment Activities:

- Challenge Problems
- Problem Solving Worksheets
- Concept Tasks

Methods of Assessments/Evaluation:

- Entry/Exit slips and scales
- Student reflection
- Math Chat
- K-W-L Graphic Organizer
- Homework (Math XL)
- Concept Tasks (Real World Analogies)
- Graded Classwork Summative Assessments
- Quizzes
- Marking Period Project
- Quarterly Assessment

Resources/Including Online Resources

- Math XL
- Google Classroom
- KhanAcademy Mission
- Selected Websites (See Appendix B)

Unit 9: Equations & Inequalities

Approximate # Of Weeks: 2 Weeks

Essential Questions:

- How do you isolate the variable using inverse operations?
- How do you solve a literal equation for a given variable?
- How do you check the value of the variable?
- What does the graph of an inequality represent?
- How do you apply equations and inequalities to real world analogies?

New Jersey Student Learning Standards: 7.EE.4, 8.EE.7

Upon completion of this unit students will be able to:

- Solve equations and inequalities in one-variable. (7.EE.4, 8.EE.7)

- Identify if an equation/inequality has one solution, no solutions, or infinite solutions. (7.EE.4, 8.EE.7)
- Graph the solution set of an inequality. (7.EE.4, 8.EE.7)

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.1 – U.S. History: America in the World
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.1 – Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- Daily guided notes/cooperative activities for each lesson (see Appendix A for sequence)
- Group work on lesson practice
- Math XL video tutorials
- Google Classroom
- KhanAcademy Mission
- Graded Classwork Summative Assessments

Enrichment Activities:

- Challenge Problems
- Problem Solving Worksheets
- Concept Tasks

Methods of Assessments/Evaluation:

- Entry/Exit slips and scales
- Student reflection
- Math Chat
- K-W-L Graphic Organizer
- Homework (Math XL)
- Concept Tasks (Real World Analogies)
- Graded Classwork Summative Assessments
- Quizzes
- Marking Period Project
- Quarterly Assessment

Resources/Including Online Resources

- Math XL

- Google Classroom
- KhanAcademy Mission
- Selected Websites (See Appendix B)

Unit 10: Linear Functions & Systems

Approximate # Of Weeks: 4 Weeks

Essential Questions:

- How do you graph a line?
- How do you calculate the slope of a line algebraically?
- How do you solve a system of linear equations?
- Can you identify when a system has one solution, no solution, or infinite solutions?
- How do you describe the graph of an equation of the form $y = mx + b$?
- How do you write an equation of a line when you are given the slope and a point?
- How do you write the equation of a line when you are given two points?
- How can you write the equation of a line of best fit (linear regression)?
- What is the difference between a relation and a function?
- How can you find the domain and range of a relation or function?
- How do you write and solve linear systems of equations?

New Jersey Student Learning Standards: 8.EE.5, 8.EE.7, 8.EE.8, 8.F.1, 8.F.2, 8.F.3, 8.F.4,

Upon completion of this unit students will be able to:

- Use graphs to represent relations and functions. (8.F.1, 8.F.2)
- Find solutions of equations in two variables. (8.F.4)
- Use x- and y-intercepts to graph linear equations. (8.F.3)
- Find and interpret slopes of lines. (8.F.3)
- Graph linear equations in slope-intercept form. (8.F.3)
- Write linear equations. (8.F.4)
- Use function notation. (8.F.4)
- Graph and solve systems of linear equations. (8.EE.8)
- Graph inequalities in two variables. (8.EE.8)

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.1 – U.S. History: America in the World
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.1 – Computer and Information Literacy

- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- Daily guided notes/cooperative activities for each lesson (see Appendix A for sequence)
- Group work on lesson practice
- Math XL video tutorials
- Google Classroom
- KhanAcademy Mission
- Graded Classwork Summative Assessments
- Linear Regression TI-84 Lab

Enrichment Activities:

- Challenge Problems
- Problem Solving Worksheets
- Concept Tasks

Methods of Assessments/Evaluation:

- Entry/Exit slips and scales
- Student reflection
- Math Chat
- K-W-L Graphic Organizer
- Homework (Math XL)
- Concept Tasks (Real World Analogies)
- Graded Classwork Summative Assessments
- Quizzes
- Marking Period Project
- Quarterly Assessment

Resources/Including Online Resources

- Math XL
- Google Classroom
- KhanAcademy Mission
- Selected Websites (See Appendix B)

Appendix A: Course Sequence

Texts:

- Holt Pre-Algebra Text (Purple) - *Bracket Items*
- Accelerated 7th Grade Big Ideas (Red) Sequence (& 8th Grade Big Ideas (Blue)) - *Parentheses Items*

Marking Period 1

Summer Assignment & Review

Unit 1: Operations with Integers

Unit 1A

- (1.1) Integers & Absolute Value
- (1.2) Adding Integers [1.5]
- (1.3) Subtracting Integers [1.6]
- (1.4) Multiplying Integers [1.7]
- (1.5) Dividing Integers [1.7]

Unit 1B

- The Coordinate Plane [1.8]

Unit 2: Rational Numbers and Equations

Unit 2A

- (2.1) Rational Numbers [5.1]
- (2.2 & 2.3) Adding & Subtracting Rational Numbers [5.2 & 5.3]
- (2.4) Multiplying & Dividing Rational Numbers [5.4 & 5.5]
- (2.3B) Number Properties [2.1 & 2.2]

Unit 2B

- (3.1 & 3.2) Algebraic Expressions [2.3]
- (3.3) Solving Equations Using Addition & Subtraction [2.5 & 2.7]
- (3.4) Solving Equations Using Multiplication & Division [2.6 & 2.7, 5.6 & 5.7]
- (3.5) Solving Two Step Equations [3.1 & 3.2]
- (4.1 - 4.4) Solving One & Two-Step Inequalities [3.4, 3.5, 3.6]

Unit 3: Proportions & Variation (with Percents)

Unit 3A

- (5.1) Ratios & Rates [6.1]
- (5.5) Slope [8.4 *rise to run*]

Unit 3B

- (5.2) Proportions [6.2]
- (5.2) Writing Proportions [6.2]
- (5.4) Solving Proportions [6.3]

Converting Measures Between Systems [6.1]

Unit 3C

(5.6) Direct Variation

(EXT5.2) Proportional Relationships

(5.6) Inverse Variation

Unit 3D

(6.1 - 6.7) Percent Applications [7.1 - 7.7]

Marking Period 2

Unit 4: Radicals & the Pythagorean Theorem

Unit 4A [Chapter 6 in 8th Grade Text]

(12.1) Finding Square Roots (*Quick Quiz*) [9.1]

(12.2) The Pythagorean Theorem [9.3]

(12.3) Approximating Square Roots [9.4]

Unit 4B

(12.4) Simplifying Square Roots [9.2]

(12.4B) Cube Roots (*Quick Quiz*)

Simplifying Cube Roots

(12.5) Using the Pythagorean Theorem (*Distance & Midpoint Formulas*) [9.5]

Unit 5: Exponents & Scientific Notation

Unit 5A

(13.1) Exponents [4.5]

(13.2) Product of Powers Property [4.5]

(13.3) Quotient of Powers Property [4.5]

(13.4) Zero & Negative Exponents [4.6]

Unit 5B

(13.5) Reading Scientific Notation [4.7]

(13.6) Writing Scientific Notation [4.7]

(13.6B) Scientific Notation (*operations*) [4.7]

Unit 6: Similarity & Transformations

Unit 6A

(12.1) Classifying Angles [12.1]

(12.2) Parallel Lines & Transversals [12.2]

(10.1) Angles and Sides of Triangles [10.1]

(10.2 & 12.3) Angles of Polygons [10.2 & 12.3]

(6.4 & 10.2) Congruent Polygons [12.3]

Unit 6B

- (6.4) Identifying Similar Figures [6.4]
- (6.5) Perimeters & Areas of Similar Figures [6.4]
- (6.5) Finding Unknown Measures of Similar Figures [6.4]
- (6.6) Scale Drawings & Models [6.6]

Unit 6C

- (12.4) Translations [12.4]
- (12.5) Reflections [12.5]
- (12.6) Rotations [12.6]
- (12.7) Dilations [12.7]
- Compositions of Transformations

Marking Period 3

Unit 7: Surface Area & Volume

- (6.2b) Area & Circumference of Circles [10.4]
- (6.1) Drawing 3-Dimensional Figures & Cross Sections
- (6.2 & 6.3) Surface Areas of Prisms & Cylinders [10.5]
- (6.4 & 6.5) Surface Area of Pyramids & Cones [10.6]
- (6.6) Surface Area of Composite Solids
- (7.1 & 7.2) Volume of Prisms & Cylinders [10.7]
- (7.3 & 7.4) Volumes of Pyramids & Cones [10.8]
- (7.5) Volume of Composite Solids

Unit 8: Data Analysis & Samples

Unit 8A

- (8.1) Stem-and-Leaf Plots & Histograms [11.1]
- [8th Grade Text]*
- (7.1) Measures of Central Tendency [11.3]
- (7.2) Box-and-Whisker Plots [11.2]
- (7.3) Scatterplots & Lines of Best Fit
- (7.4) Choosing a Data Display

Unit 8B

- (8.4) Samples & Populations [11.4]
- (8.4B) Comparing Populations [11.5]
- Two Way Tables [11.5]
- Margin of Error [11.5]
- Mean Absolute Deviation

Unit 8C

- (9.1) Introduction to Probability [6.7]
- (9.2) Theoretical Probability [6.8]
- (9.3) Experimental Probability [6.8]
- (9.4) Independent & Dependent Events [11.9]
- Compound Events [11.8]
- Odds [6.7]
- Simulation [11.9]

Marking Period 4

Unit 9: Equations & Linear Functions

Unit 9A

- (10.1) Solving Multistep Equations [3.2]
- (10.2) Solving Equations with Variables on Both Sides [3.3]
- (10.2B) Solutions of Linear Equations (No Solution/Infinite Solutions) [3.3]

Unit 9B

- (1.4) Rewriting Equations & Formulas
- (2.1) Graphing Linear Equations [8.2]
- (2.3) Graphing Linear Equations in Slope Intercept Form [8.5]
- (2.4) Graphing Linear Equations in Standard Form [8.3]

Unit 9C

- (3.1) Writing Equations in Slope Intercept Form [8.6]
- (3.2) Writing Equations Using Slope and a Point [8.6]
- (3.3) Writing Equations Using Two Points [8.6]
- (3.4) Solving Real World (Scatterplots)

Unit 10: Linear Equations [*From 8th Grade Text (Blue)*]

Unit 10A

- (2.5) Systems of Linear Equations [8.8]
- (2.6) Special Systems of Linear Equations [8.8]
- (2.7) Solving Equations by Graphing [8.8]
 - Solving Systems by Substitution [8.8]
 - Solving Systems by Elimination [8.8]
- (3.5) Writing Systems of Linear Equations [8.8]

***Unit 10B**

- Relations & Functions [8.1]
- (10.5) Linear Functions [8.1 & 8.2]
- Function Notation [8.7]
- (4.1) Domain & Range of a Function

(4.2) Discrete & Continuous Functions

*Unit 10C

Linear Inequalities [8.9]

Graphs of Linear Inequalities [8.9]

Systems of Linear Inequalities

Assessments

- Graded Classwork at the end of each sub-unit
- Quiz at the end of each sub-unit, following review of *graded classwork*
- Test after each marking period (Quarterly)

* *To be completed if time allows*

Appendix B: Selected Websites

Website Title	Description	URL
Illustrative Mathematics	Concept tasks divided by domain and substandard.	https://www.illustrativemathematics.org/
Khan Academy	A forum that allows a class to be set-up and progress through a content missions to be monitored.	http://www.khanacademy.org
Virtual Nerd	Video tutorials on mathematics concepts.	http://www.virtual
Math Bits	A website that offers lessons and activities that are challenging in secondary mathematics and computer programming.	http://www.mathbits.com/
Shodor	A national resource for computational science education.	http://www.shodor.org/interactivate/activities
Illuminations by NCTM	Activities developed by standard created by the National Council of Teachers of Mathematics.	http://illuminations.nctm.org/Activities.aspx?grade=all

Engage NY	Common core curriculum and applications by grade level.	https://www.engageny.org/resource/grade-7-mathematics https://www.engageny.org/resource/grade-8-mathematics
Brain Pop	Video clips and quizzes on various elementary and middle school concepts.	http://www.brainpop.com/
Quia	A website that allows the teacher to create or search for educational games.	http://www.quia.com/
Desmos	A virtual calculator and graphing tool.	http://www.desmos.com/
Super Teacher Tools	Website that offers tools for teachers such as random name chooser, group makers, seating charts, timers, jeopardy, who wants to be a millionaire, plus other flash games to use for review, plus search premade review games to use in the classroom.	http://www.superteachertools.com
Math Open Reference	Website that offers animation of many geometric constructions.	http://www.mathopenref.com/constructions.html
Kahoot	An interactive game site that allows you to search and create a competitive computer engaged game based on specific content.	http://www.kahoot.com

